Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band	)	GN Docket No. 12-354

COMMENTS OF PCIA—THE WIRELESS INFRASTRUCTURE ASSOCIATION AND THE DAS FORUM, A MEMBERSHIP SECTION OF PCIA

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I. INTRODUCTION AND SUMMARY

PCIA—The Wireless Infrastructure Association and The DAS Forum, a membership section of PCIA,[1] submit these comments in response to the above-captioned Notice of Proposed Rulemaking and Order ("*NPRM*") seeking comment on service rules for the 3550-3650 MHz band ("3.5 GHz band").[2] PCIA and The DAS Forum support the FCC's proactive approach to securing additional spectrum to meet the escalating data needs of Americans. As the *NPRM* accurately states, "[d]emand for wireless broadband capacity is growing much faster than the availability of new spectrum."[3] This fact inevitably leads to the conclusion that all currently available spectrum must be utilized as efficiently as possible. Low-power distributed antenna systems ("DAS networks") and small cell solutions, which put antennas closer to the end user, are part of the remedy. These technologies will help to address the wireless data crunch and will

[1] PCIA is the national association representing the wireless telecommunications infrastructure industry. PCIA's members own and manage more than 125,000 telecommunications towers and antenna structures across the country upon which cell sites can be collocated. The DAS Forum's members include DAS providers and CMRS carriers that construct, modify, own, operate, lease and manage distributed antenna system facilities nationwide.

[2] *In re* Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, *Notice of Proposed Rulemaking and Order*, 27 FCC Rcd 15594 (2012) ("*NPRM*").

[3] *Id.* ¶ 2.

allow for more efficient spectrum management and increased utilization.[4] The FCC should put into effect policies and procedures that provide for the greatest utilization and highest efficiencies possible to both optimize spectrum use and facilitate deployment of DAS networks and small cell solutions.

To that end, if the FCC adopts a Citizen's Broadband Service ("CBS") with a priority access tier, commercial wireless service providers should be allowed to have access to that tier. Second, the CBS's frequency coordination, database management, and interference mitigation functions should be administered by the private sector and not the federal government. Third, the FCC should not limit use of the 3.5 GHz band to indoor deployments. Fourth, the FCC should work to ease the hurdles to DAS and small cell deployment in both indoor and outdoor settings.

II. DAS AND SMALL CELL SOLUTIONS WILL PROVIDE EFFICIENCIES IN THE SHARED USE OF THE 3.5 GHZ BAND

As the FCC recognizes, DAS networks and small cell solutions are advantageous for wireless networks.[5] Low-power DAS nodes and small cells that are closer to the end user unlock

[4] President's Council of Advisors on Science and Technology, Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth, ¶¶ 17-20 (rel. July 20, 2012) ("PCAST Report"), *available at* http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf. A DAS network consists of three primary components: (i) a number of remote communications nodes ("DAS node(s)"), each including at least one antenna for the transmission and reception of a wireless service provider's RF signals; (ii) a high capacity signal transport medium (typically fiber optic cable) connecting each DAS node back to a central communications hub site; and (iii) radio transceivers or other head-end equipment located at the hub site that propagates and/or converts, processes or controls the communications signals transmitted and received through the DAS nodes. Depending on the particular DAS network architecture and the environment in which it is deployed, DAS nodes may include equipment in addition to the antennas, *e.g*., amplifiers, remote radio heads, signal converters and power supplies. Historically, the term "small cell" has been used to refer to microcells, picocells/metrocells, and femtocells. There are certain similarities between DAS nodes and small cells. Like DAS nodes, small cells transmit at signal power levels that are much lower than macrocells and are physically much smaller. Both DAS and small cells may be deployed in indoor and outdoor environments.

[5] In 2011 and 2012 the FCC and the Technological Advisory Council ("TAC") held a number of public forums examining the benefits and applications of DAS Networks and small cell solutions. In its December 2011 meeting, the TAC recognized as a potential positive economic benefit of small cells "Improved Broadband Wireless Coverage and Capacity within Buildings," and "Potential Spectrum Efficiency Improvements" and ultimately recommended that the Commission allocate 100 MHz of dedicated spectrum for small cell networks in the 3.5 GHz Band. Presentation, *Technological Advisory Council Meeting December 20, 2011*, slide 5 (Dec. 20, 2011), http://transition.fcc.gov/oet/tac/tacdocs/Dec2011_mtg_full.ppt. *See also NPRM* ¶ 6; FCC Forum on Indoor Deployments of Small Cell Sites, FCC (Oct. 28, 2011), http://www.fcc.gov/events/forum-indoor-deployments-

the potential for more efficient use and re-use of limited spectrum resources. DAS networks and small cell solutions also can play an important role in augmenting the larger network, making up the Heterogeneous Network or HetNet.[6] In the licensed space, DAS networks and small cell solutions are being deployed to provide coverage in targeted locations and to provide additional call and data-handling capacity in areas with concentrated demands for wireless services where consumer demand is highest. AT&T recently disclosed a three-year plan that includes the use of 1,000 DAS networks and 40,000 small cells,[7] and Sprint is partnering with Alcatel-Lucent to deploy metrocells, called lightRadio, across its network.[8] These are only a two of the myriad examples of rapid adoption and deployment of DAS networks small cell solutions. Macrocell sites, DAS networks, and small cell solutions each have unique characteristics and capacities that address particular coverage and capacity challenges to meet the demand of American citizens.[9]

Making additional spectrum available for exclusive licensed use is always advisable because it provides, among other things, certainty that fosters investment in wireless networks.[10]

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small-cell-sites; Augmenting Mobile Broadband in Your Community - An Overview of Distributed Antenna Systems and Small Cell Solutions, FCC (Feb. 1, 2012), http://www.fcc.gov/events/augmenting-mobile-broadband-your-community-overview-distributed-antenna-systems-and-small-cel ("Augmenting Mobile Broadband").

[6] The combination of the macrocellular network with DAS networks and various small cell solutions has been termed the "heterogeneous network" or "HetNet".

[7] *See* Press Release, AT&T, Inc., AT&T to Invest $14 Billion to Significantly Expand Wireless and Wireline Broadband Networks, Support Future IP Data Growth and New Services (Nov. 7, 2012), http://www.att.com/gen/press-room?pid=23506&cdvn=news&newsarticleid=35661.

[8] *See* Press Release, Alcatel-Lucent, Sprint to Leverage Alcatel-Lucent's lightRadio to Bring High-capacity 4G LTE Mobile Broadband Coverage and Speeds to Busy Public Locations (Aug. 6, 2012), http://www.alcatel-lucent.com/solutions/lightradio.

[9] However, it is important to note that while DAS networks and small cell solutions utilizing shared 3.5 GHz spectrum may provide improved offload capacity, these technologies are not replacements for macrocellular infrastructure including traditional towers and non-tower structure attachments.

[10] *See*, Comments of AT&T, Spectrum Task Force Requests Information on Frequency Bands Identified by NTIA as Potential Broadband Spectrum, ET Docket No. 10-123, at 7 (filed Apr. 22, 2011) (AT&T Spectrum Task Force Comments).

Given that the 3.5 GHz band's unique propagation characteristics and incumbent federal users,[11] the Commission's alternative approach using a shared access model is innovative, and DAS networks and small cell solutions will play a vital role in making the 3.5 GHz band viable for wireless broadband. As indicated in NTIA's Fast Track Report, massive exclusion zones that encompass some of the United States' most populous cities may be necessary to protect incumbent users and could prohibit the use of the 3.5 GHz band for broadband by nearly 60% of Americans.[12] To the extent that DAS Networks and small cells, in conjunction with other solutions proposed in the *NPRM*,[13] can facilitate re-use spectrum to shrink the Fast Track Report's proposed exclusion zones so that more users will have access to the 3.5 GHz band through small cell technology, the CBS will be a more viable option for all potential adopters and service providers.[14]

The *NPRM* also seeks comment on whether CBS operations should be allowed in areas where secondary users could possibly receive interference from incumbent radar stations.[15] Even in areas where there may be potential interference, users may find utility and innovative

[11] As the *NPRM* notes, "under the free space line of sight condition, a signal propagating at 3.5 GHz would be expected to decay faster than a signal in lower frequency bands, yielding approximately 29 percent reduced range compared to Broadband Radio Service/Educational Broadband Service (2.5 GHz), 45 percent compared to Personal Communications Service (1.9 GHz), and 75 percent compared to the Cellular bands (850 MHz)." *NPRM* ¶ 19. Nonetheless, small cell deployments are suited to this challenge: "Small cell deployments inherently require less range to meet users' needs than macrocell networks. Moreover, limited signal propagation can facilitate dense deployment of small cells with a reduced risk of harmful interference to geographically or spectrally adjacent users, greatly increasing frequency reuse and available network capacity. On the other hand, the signal propagation at 3.5 GHz is still viable for non-line-of-site use, allowing for flexible network topologies. In short, given the characteristics of the band, the 3.5 GHz Band appears to be a good candidate for small cell uses." *Id.* ¶ 20.

[12] *Id.* ¶ 6. *See* NTIA, An Assessment of the Near-Term Viability of Accommodating Wireless Broadband Systems in the 1675-1710 MHz, 1755-1780 MHz, 3500-3650 MHz, 4200-4220 MHz, and 4380-4400 MHz Bands, at 1-6 to 1-7 (rel. October 2010) ("Fast Track Report"), *available at* http://www.ntia.doc.gov/files/ntia/publications/fasttrackevaluation_11152010.pdf.

[13] *See The 1000x Data Challenge*, Qualcomm (last visited Feb. 20, 2013), http://www.qualcomm.com/solutions/wireless-networks/technologies/1000x-data (explaining Qualcomm's Authorized Shared Access ("ASA") system, a two-tiered model which could be utilized in the 3.5 GHz band).

[14] *NPRM* ¶ 59.

[15] *Id.*

applications for the 3.5 GHz band through opportunistic techniques; DAS networks and small cell solutions will likely be leveraged to that end. Therefore, the Commission should endeavor to allow use of the band even where there may be the potential for interference from incumbents.

III. THE COMMISSION SHOULD ADOPT POLICIES THAT MAXIMIZE THE POTENTIAL UTILITY OF THE 3.5 GHZ BAND

A. Wireless Service Providers Should Have Access to the Priority Access Tiers for Small Cell Use

The *NPRM* suggests a multi-tiered shared access model that would include Incumbent Access, Priority Access, and General Authorized Access tiers to be managed by a spectrum access system ("SAS").[16] Commercial wireless service providers and other operators should have access to the Priority Access tier in the proposed 3.5 GHz band on a secondary basis from incumbent users. Doing so will allow for traffic off-loading and the development of wireless backhaul solutions for small cells.

Furthermore, limiting access to the Priority Access tier to the class of users proposed in the *NPRM* would hinder innovative partnerships being developed across industries.[17] Today commercial operators often partner with proposed Priority Access users in their deployments, such as those in hospitals and campuses, to provide services over licensed and unlicensed bands. Neutral host providers and wireless provider-installed systems already built and those yet to be built may be able to immediately leverage the 3.5 GHz band. That would not be possible, however, if the Commission distinguishes between the user and the owner of the system.

[16] *Id.* ¶¶ 7-10.

[17] The NPRM suggests that the class of users within the Priority Access tier could include hospitals, utilities, state and local governments, but not commercial wireless service providers or operators. *See id.* ¶ 9.

B. The 3.5 GHz Band Frequency Coordination, Database Management and Interference Mitigation Role Should be Left to the Private Sector

The private sector is best suited to administer the frequency coordination, database management and interference mitigation functions in the 3.5 GHz band.[18] Placing these functions within the private sector can leverage market forces that will drive more rapid innovation and increased efficiencies the federal government cannot provide. Private sector database management is also agile: any initial technical problems could be resolved outside of a rulemaking process. Further, it allows for industry collaboration, such as best practices, to continually adapt to achieve the best result. The fact that a database would be managed by a private administrator does not mean that there would not be sufficient safeguards for partner federal agencies, because the database can be designed such that any sensitive information would only need to be shared with the vetted and cleared database administrator and not all end users.

IV. CLARITY AND PREDICTABILITY IN THE INFRASTRUCTURE DEPLOYMENT PROCESS IS REQUIRED FOR RAPID ADOPTION AND INNOVATION IN THE 3.5 GHZ BAND

The development of the CBS is but the first step in the effective utilization of the 3.5 GHz band. The critical next steps are adoption and deployment of the necessary infrastructure. The deployment of DAS networks and small cell solutions requires access to installation points, fiber optic or coaxial runs for broadband backhaul, and a continuous and uninterrupted source of power. Gaining access, installing and servicing these various elements requires the involvement of a variety of stakeholders, public and private. As the *NPRM* notes, propagation within the 3.5 GHz band results in smaller cells of coverage thus necessitating a greater density of DAS nodes

[18] PCIA has a long history of working with the FCC and other government entities in this area and has experience in coordinating frequencies for land mobile radio, paging, and administration of the Advanced Wireless Services ("AWS") and microwave clearing houses. *See PCIA's Frequency Coordination Services – Leading the Industry*, PCIA (last visited Feb. 20, 2013), http://www.pcia.com/index.php?option=com_content&view=article&id=32&Itemid=10.

or small cells. The additional access points multiply the challenges for bringing in power, and backhauling data to the larger network.

The *NPRM* notes that, "[s]mall cells can be deployed relatively easily and inexpensively by consumers, enterprise users, and service providers."[19] While in certain situations this may be true, it does not take into account the complex permitting and compliance issues that accompany the deployment of supporting infrastructure for small cells—which includes elements such as wired backhaul and power.

PCIA and The DAS Forum recognize that the FCC has made significant progress with respect to DAS network and small cell deployment, most recently with the FCC's clarification of terms included in Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012.[20] Yet, more remains to be done. PCIA is heartened by the comments of Chairman Genachowski which "announced actions in the coming months to further streamline DAS and small cell deployment."[21]

Today there remain rules and regulations enacted to accommodate a generation of wireless infrastructure and that did not contemplate DAS networks and small cell solutions. These policies create unnecessary confusion and delays in wireless broadband buildout. To speed

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[19] *NPRM* ¶ 4. *See also id.* ¶ 32.

[20] The Commission recently clarified that the definition of "base station" in the context of Section 6409 includes DAS networks and small cell solutions:

> Section 6409(a) applies to the collocation, removal, or replacement of equipment on a wireless tower or base station. In this context, we believe it is reasonable to interpret a 'base station' to include a structure that currently supports or houses an antenna, transceiver, or other associated equipment that constitutes part of a base station. Moreover, given the absence of any limiting statutory language, we believe a 'base station' encompasses such equipment in any technological configuration, including distributed antenna systems and small cells.

Wireless Telecommunications Bureau Offers Guidance on Interpretation of Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, Public Notice, 28 FCC Rcd 1, at 3 (Jan. 25, 2012), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0128/DA-12-2047A1.pdf (citations omitted).

[21] Press Release, FCC, FCC Chairman Julius Genachowski Announces New Broadband Acceleration Initiative Actions; Clarifies Rules to Speed Wireless Infrastructure Deployment; Moves to Expedite Temporary Cell Towers, at 1 (Jan. 25, 2013), http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0125/DOC-318589A1.pdf.

deployment of and adoption within the 3.5 GHz band the Commission should identify and address these bottlenecks in the deployment of DAS networks and small cell solutions, including regulatory barriers in both indoor and outdoor applications.

Existing regulations designed for macrocells could and in some cases already are overshadowing small cells and impacting their deployment. PCIA urges the Commission to take a holistic review of its current rules, as part of this proceeding and other appropriate proceedings, to ensure the timely and cost-effective deployment of small cells, including those in the 3.5 GHz band.[22] Further, if the FCC finds that federal users should be allowed to share in the use of the 3.5 GHz band, it should continue its work with the Broadband Deployment on Federal Property Working Group to facilitate deployment and adoption of this broadband technology by federal users.[23]

Inbuilding small cell solutions can provide opportunity to breathe new life into old buildings. Amos J. Loveday, Ph.D., a noted historic preservation expert and former State Historic Preservation Officer of the State of Ohio, stated at the FCC's *Augmenting Mobile Broadband Forum* that indoor small cell solutions "provide a level of service that revitalizes, or

[22] To this end, PCIA has in prior comments and *ex partes* provided the FCC with potential solutions to streamline the deployment of DAS Networks and small cell solutions. Among these proposals is a declaration that DAS Networks and small cell deployments are not federal undertakings and are thus excluded from Section 106 requirements under the Nationwide Programmatic Agreement ("NPA"). *See* PCIA, Ex Parte Communication, WC Docket No. 11-59 (filed Feb. 15, 2013), http://apps.fcc.gov/ecfs/document/view?id=7022121961; PCIA, Ex Parte Communication, WC Docket No. 11-59, PS Docket No. 11-60, WT Docket No. 10-88, RM 11349 (filed Dec. 18, 2013), http://apps.fcc.gov/ecfs/document/view?id=7022085801; PCIA, Ex Parte Communication, WC Docket 11-59, PS Docket No. 11-60 (filed Dec. 6, 2012), http://apps.fcc.gov/ecfs/document/view?id=7022075276.

[23] The Broadband Deployment on Federal Property Working Group is charged with "ensur[ing] a coordinated and consistent approach in implementing agency procedures, requirements, and policies related to access to Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands to advance broadband deployment." Exec. Order No. 13,616, 77 Fed. Reg. 36,903, at 36,903 (June 14, 2012), *available at* http://www.gpo.gov/fdsys/pkg/FR-2012-06-20/pdf/2012-15183.pdf. *See also NPRM* ¶ 76.

at least makes historic buildings equally usable as modern buildings."[24] Loveday also noted that the technology "provides the type of service that can be blended very easily" and that if projects are presented to preservationists correctly and well explained, "preservationists clearly understand this is the type of technology that preservationists have really been praying for all time."[25]

While PCIA and The DAS Forum strongly support the utilization of the 3.5 GHz band indoors, limiting small cells to only indoor applications is overly cautious. The *NPRM* asks whether "[l]imiting Citizens Broadband Service use of the 3.5 GHz Band, at least in part, to indoor locations may reduce the amount of harmful interference received by incumbent users."[26] With properly engineered installations and well-administered, accurate databases, use of the 3.5 GHz band outdoors should not cause harmful instances of interference.

V. CONCLUSION

For the foregoing reasons, the FCC should put into effect policies and procedures that provide for the greatest utilization and highest efficiencies possible to both optimize spectrum use and facilitate deployment of DAS networks and small cell solutions.

Respectfully submitted,

PCIA–THE WIRELESS
INFRASTRUCTURE ASSOCIATION & THE
DAS FORUM

[24] Presentation, Amos J. Loveday, Ph.D., Atchley Hardin Lane, Panel #2: DAS and Small Cell: Broadband Uses in the Public Space (Feb. 1, 2012), *available at* http://www.fcc.gov/events/augmenting-mobile-broadband-your-community-overview-distributed-antenna-systems-and-small-cel.

[25] *Id.*

[26] *NPRM* ¶ 150.

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